

Johannes Kepler

By Sharon Fabian

Johannes Kepler grew up in an exciting time for scientists. During his lifetime, the way people looked at the heavens was changing.

In the old way of understanding the universe, or the solar system as we call it today, the earth was at the center. The planets were believed to revolve around the earth, and the stars never changed. Some scientists pictured the heavens as a series of crystal spheres that turned slowly around the earth. The planets were fastened to these spheres, and that is how they moved.

This was not just the scientific position of that time; it was also the religious position. The Church taught that the arrangement of the solar system was part of God's plan. God was known as the Prime Mover of the spheres, and Heaven was located in the outermost sphere. This had been the accepted view of the solar system for nearly 2,000 years.

In the 1500s and 1600s, some scientists were beginning to question all or part of this theory. Copernicus had already stated that the sun, not the earth, was at the center of the solar system. Galileo had been condemned by the Church for publishing similar views.

Another scientist, Tycho Brahe, had built an observatory and begun to take careful measurements of the objects in the sky. Johannes Kepler went to work for Tycho Brahe as his assistant. He was put to work on a puzzling part of the project. Kepler's assignment was to figure out the orbit of Mars. At that time, it was believed that all of the planets' orbits were circular since they were within the crystal spheres. The measurements they had been getting for Mars, however, didn't fit with the idea of a circular orbit. Kepler figured out that the orbit of Mars was an ellipse, or oval, rather than a circle.

This discovery led to other discoveries. Soon, Kepler had a picture of the solar system that made more sense than any of the older ideas. It was Kepler who gave us the view of the solar system that we still have today - the sun in the middle and the earth and the other planets revolving in elliptical orbits around the sun.

Kepler didn't stop there. He kept working on the math until he had discovered three laws of planetary motion. His first law explained the elliptical orbits. His second law stated that each planet moves faster when it is nearer to the sun. His third law said that the planets closest to the sun make one orbit in the fastest time, and the planets farther from the sun make one orbit in a much longer time. We now know that Mercury orbits the sun in 88 days, while Neptune orbits in 165 years!

Today, scientists continue to use Kepler's method of studying the solar system by using math. We can see that scientists still have great respect for Kepler's work by the many interesting things that have been named after him. There is a star, a crater on the moon, a crater on Mars, and an asteroid named Kepler.

There is also an important science project going on right now named after the famous scientist - the Kepler Space Observatory. This is a project to send a telescope into solar orbit. The telescope will search for planets beyond the solar system. It will do this by observing the brightness of the thousands of stars that it observes. A change in a star's brightness can be a clue that a planet is passing by in front of the star.

Maybe discoveries made from the Kepler Space Observatory will change our view of the heavens once again, just as Kepler's discoveries changed the picture of the heavens during the Renaissance.

The Kepler Space Observatory is scheduled to launch in 2008.



Name _____



Date _____

Johannes Kepler

Questions

- _____ 1. _____ discovered the arrangement of the sun and the planets that we know today.
- A. Kepler
 - B. Galileo
 - C. Tycho Brahe
 - D. Copernicus
- _____ 2. Kepler stated three laws of _____.
- A. scientific observation
 - B. space travel
 - C. planetary motion
 - D. the universe
- _____ 3. Kepler worked as an assistant to _____.
- A. Copernicus
 - B. Tycho Brahe
 - C. Galileo
 - D. all of the above
- _____ 4. Kepler's discoveries went against the teachings of the Church.
- A. true
 - B. false
- _____ 5. Kepler used _____ to make his discoveries.
- A. math
 - B. experiments
 - C. ancient writings
 - D. microscopes
- _____ 6. Kepler stated that the sun and the planets revolved around the earth.
- A. false
 - B. true
- _____ 7. The word *elliptical* means _____.
- A. oval
 - B. triangular
 - C. round
 - D. spherical
- _____ 8. The idea that the heavens consisted of crystal spheres came _____ Kepler's discoveries.
- A. at the same time as
 - B. after
 - C. during
 - D. before

Name _____



Date _____

Write a paragraph comparing the old view of the solar system with the modern view of the solar system. Draw two sketches to illustrate your paragraph.

How do you think people of the Renaissance might have reacted when they first heard scientists claiming that the sun, rather than the earth, was the center of the solar system?
